

MASS-REARING METHOD FOR THE LARGE MILKWEED BUG, *ONCOPELTUS FASCIATUS* (HEMIPTERA: LYGAEIDAE)¹

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ABSTRACT: A method of mass-rearing the large milkweed bug, *Oncopeltus fasciatus*, has been developed that requires limited time and costs. This method allows removal of the eggs without disturbing the adults or damaging them during handling. Eggs are produced for about \$1.30/1000 eggs.

The large milkweed bug, *Oncopeltus fasciatus*, has been the subject of much experimental research. Mass-rearing methods specifically designed to reduce labor required to maintain the colony, and reduce difficulties experienced in gathering eggs seem to have escaped the literature (Anonymous 1982, Best 1977, Butt 1949, Dingle 1968, Gordon 1974, Richards and Kolderie 1957, Richards and Suanraksa 1962, Siverly 1962). Methods of collecting eggs described in these studies include removing them with small brushes from cotton or gauze oviposition media. These techniques sometimes cause egg damage and always disrupt the adult colony. We have developed a labor conservative method for rearing large milkweed bugs that, if implemented, will assist other researchers in maintaining their colonies. Harvesting and handling eggs will be especially enhanced.

Materials listed are adequate for about 195 breeding pairs of adults. Expansions or reductions in the number of specimens (especially eggs) required should be made according to space requirements of the adult pairs, each pair requiring 38 to 46 cm² for optimum egg production. Gordon (1974) found optimum egg production was obtained at about 38 cm²/pair. Increased densities will cause some reduction in the rate of egg production. Materials required are: five plastic freezer storage containers about 3.019 cm² (6.5-7.0 l capacity), ten 250 ml nalgene water bottles, grade 50 (6.5-7.0 l capacity), ten 250 ml nalgene water bottles, grade 50 cheesecloth, cotton, No. 233 and 363 Nitex nylon monofilament screen cloths, 25 mgs of sunflower seeds per week that have not been sprayed with pesticides, and 50 large milkweed bug eggs.

Adult cages (Fig. 1) are designed to give females no choice of where to oviposit. The only satisfactory site is through the cheesecloth onto paper sheets provided outside (below) the cages. The center portion of the original snap-on lid is cut away so that only the snap-on (S) rim remains (Fig. 1A). This rim is used to secure the stretched cheesecloth (Z) onto the bottom of

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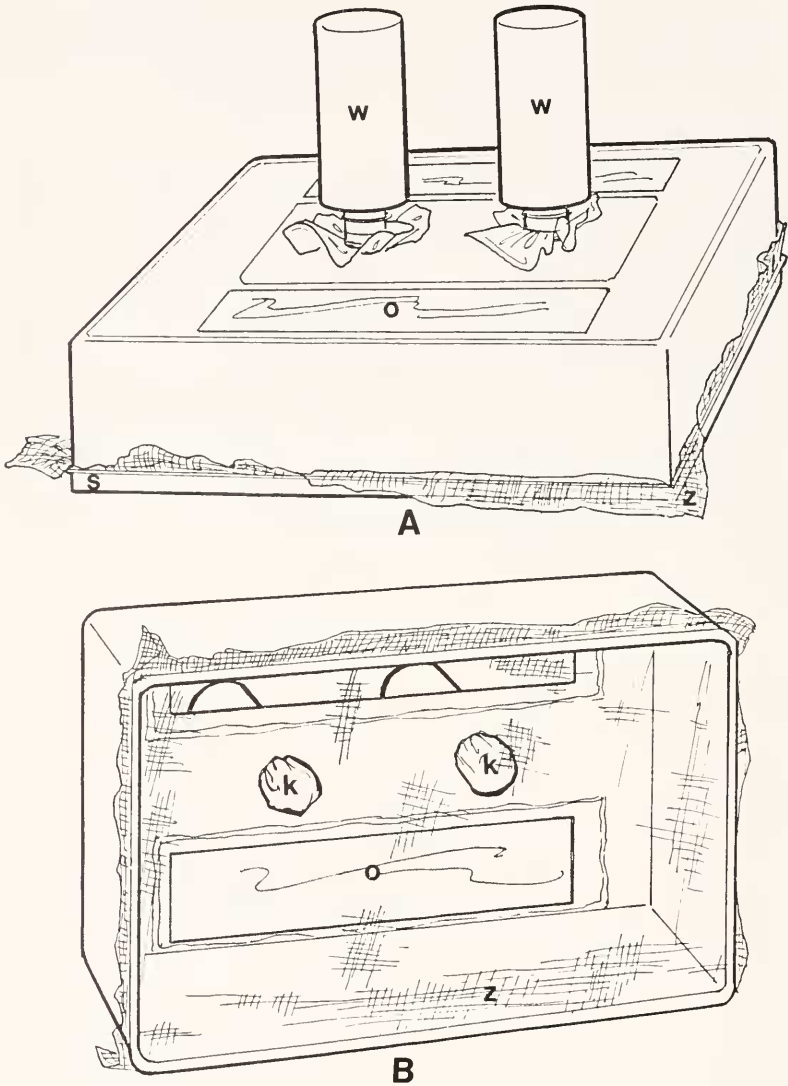


Figure 1. A — Top view of adult rearing cage: W = water bottles; O = windows cut in the original bottom of the freezer storage container; S = snap-on lid with the center removed, leaving only the rim to hold the cheesecloth (Z) bottom. B — Bottom view showing the wicks (K) from the water bottles; cheesecloth (Z) bottom held in place by the rim of the snap-on lid (S); and the windows (O); all seen through the cheesecloth.

the cage. Water (W) is provided through two holes cut in the bottom (which is the top of the cage when completed, (Fig. 1A) of the freezer container, in which water bottles with tight cotton wicks (K) covered with No. 233 screen cloth are inserted (Fig. 1B). The screen cloth prevents oviposition into the cotton. Windows (O) in the top of the cage are covered with No. 363 screen cloth glued into place to allow observation and yet prevent oviposition (Fig. 1). About 15 gms of sunflower seeds and 65 adults pairs are introduced into the cage before the water bottles are screwed in place. The cage is then placed on or above the collection sheets (paper) where eggs are collected as often as needed. Eggs may be continuously collected from outside the cage without ever opening the cage until it is time to discard the adults. Three adult cages are required.

Nymph cages are the same as adult cages except: (1) the center of the lid is not removed, (2) wicks in the water bottles are not covered with screen cloth, and (3) about 50 gms sunflower seeds are cracked to provide a better food base for the young nymphs. Sunflower seeds and eggs are placed in the cages before the water bottles are screwed into place. These cages need no additional care until emerged adults are removed and placed in the adult cages. Two nymph cages are required.

Collecting 200 eggs from the first collection of adults (4 weeks) will take longer than subsequent collections since only 25 adult females are present. More eggs to start with would speed up this process.

Week 14 is the beginning of routine maintenance, with the reinoculation of adults into adult cage "1" after it has been cleaned, and gauze and water bottles with their cotton wicks replaced. After this, 400 nymphs and 195 adults will be maintained continuously. Maintaining this colony indefinitely will require about 25 gms of sunflower seeds per week, which should be stored in refrigeration to avoid contamination with stored products pests. Egg production is maximized with a photoperiod of 16L-8D, and temperature set at 27° C (Dingle 1968).

Cost and time assessments for this method are unusually conservative. The initial cost, excluding intitutional costs, for the entire system ready to maintain at week 14 is estimated at \$85, 25% of which is for the cost of 50 eggs. Maintenance cost expressed in terms of eggs produced is about \$.70/1000 eggs. In addition, the labor estimate is about \$2.50/1000 eggs. We estimate eggs counted into groups of 1000 will cost about \$3.20 per group. Of course, if approximate number of eggs is acceptable the cost is much less, about \$1.30/1000. Only about five minutes per collection are required to collect eggs, plus one hour twice monthly to clean cages, transfer adults and collect eggs for future generations. This method offers minimal expense in maintaining a colony where specimens are needed continually for experimental purposes.

Colony establishment and maintenance are sequentially explained in the following flow table:

Table 1. Flowtable to explain colony established and maintenance.

| Week | Action | Cage contents and collection no. | | | | |
|------|---|----------------------------------|------------|-------------|------------|------------|
| | | Nymph cages | | Adult cages | | |
| 0 | 50 eggs placed in nymph cage "a" | a=1st coll | b=empty | 1=empty | 2=empty | 3=empty |
| 4 | 25 pairs of adults from nymph cage "a" placed in adult cage "1" | a=1st coll | b=empty | 1=1st coll | 2=empty | 3=empty |
| 6 | 200 eggs from adult cage "1" placed in nymph cage "b" | a=empty | b=2nd coll | 1=1st coll | 2=empty | 3=empty |
| 8 | 200 eggs from adult cage "1" placed into nymph cage "a" | a=3rd coll | b=2nd coll | 1=1st coll | 2=empty | 3=empty |
| 10 | 65 pairs of adults from nymph cage "b" placed in adult cage "2." 200 eggs from adult cage "1" placed into nymph cage "b" | a=3rd coll | b=4th coll | 1=1st coll | 2=2nd coll | 3=empty |
| 12 | 65 pairs of adults from nymph cage "a" placed in adult cage "3." 200 eggs from adult cages "1 and 2" placed into nymph cage "a" | a=5th coll | b=4th coll | 1=1st coll | 2=2nd coll | 3=3rd coll |

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